REMARKS

Prior to this amendment, claims 1-44 were pending in this application. The Office Action rejected:

Claims 1-35 under 35 U.S.C. § 101 stating that the claims were directed to non-statutory subject matter;

Claim 28 under 35 U.S.C. § 112, second paragraph, as being indefinite for containing the term "substantially less";

Claims 1-14 and 17-44 under 35 U.S.C. § 102(e) as being anticipated by U.S. patent No. 6,480,790 to Calvert *et al.* ("Calvert"); and

Claims 15 and 16 under 35 U.S.C. § 103(a) as being unpatentable over Calvert in view of U.S. Patent No. 5,966,141 to Ito ("Ito").

The present amendment amends claims 1, 28 and 36 and cancels claims 2, 37 and 42. Therefore, claims 1, 3-36, 38-41, 43 and 44 are presented for examination after the entry of this amendment. No new matter is added by the amendments to claims 1, 28 and 36. Reconsideration of the present application as amended is requested.

Section 101 Rejections

In the Office Action, claims 1-35 were rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter. In this amendment, independent claim 1 has been amended to include the limitation of "altering activity relating to extraction of hydrocarbons from a hydrocarbon reservoir based on the processed earth model data." Applicants respectfully submit that as amended, independent claim 1 and the claims depending from claim 1 describe a method that produces a useful, concrete and tangible result in accordance with the requirements of 35 U.S.C. §101.

Section 112 Rejections

In the Office Action claim 28 was rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for containing the term "substantially less." As such, Applicants have amended claim 28 to remove the term "substantially less".

Section 102(e) Rejections

In the Office Action, claims 1-14 and 17-44 were rejected under 35 U.S.C. § 102(e) as being anticipated by Calvert. As amended, independent claims 1 and 36 include the limitations providing that activity relating to extraction of hydrocarbons from a hydrocarbon reservoir is altered based on the processed earth model data. Furthermore, independent claims 1 and 36 have been amended to include the limitation "wherein the identified symmetry transformation group is a set of diffeomorphisms that act on a topologically closed and bounded region in space-time such that under transformation said region occupies the same points in space." As such, independent claims 1 and 36 describe a method and a system in which the sampled data is searched for structures or objects and critical points and based on this search/analysis, a model is built using the structures and the critical points to "stretch" these structures through space (and time). Therefore, the claimed invention is one in which a geological model is built based on its time/space evolution. In other words, in the present invention, as provided in the amended independent claims, a model is generated that reconstructs the geological history of the reservoir. Furthermore, the generated model of the reservoir is used to control activity relating to extraction of hydrocarbons from a hydrocarbon reservoir.

Calvert discloses a process for constructing three-dimensional geological models having adjustable geological interfaces. Calvert outputs a 3D model of geological interfaces and rock properties. (*See* Calvert, Fig. 1). Calvert does not provide a non-static system and method that generates a model reconstructing a geological history of a reservoir that is used to control hydrocarbon extraction from the reservoir.

More specifically, Applicants respectfully submit that Calvert does not teach the limitation of independent claims 1 and 36 as amended of altering activity relating to extraction of hydrocarbons from a hydrocarbon reservoir based upon processed earth model data. And Applicants respectfully submit that Calvert does not teach the limitation of independent claims 1 and 36 as amended of stretching structure through space and time to generate a geological history of a reservoir.

Consequently, Applicants respectfully submit that Calvert does not teach all of the limitations of independent claims 1 and 36 as amended. Therefore, Applicants

respectfully request that the Section 102(e) rejections of independent claims 1 and 36 and the respective claims depending from these independent claims be withdrawn.

Section 103(a) Rejections

In the Office Action, Claims 15 and 16 under 35 U.S.C. § 103(a) as being unpatentable over Calvert in view of Ito. Ito teaches an apparatus and method for animation using topology. Applicants respectfully submit that Ito, like Calvert, does not teach or suggest the limitations of independent claims 1 and 36 of generating a geological history of a reservoir and using the generated data model to alter activity relating to extraction of hydrocarbons from a hydrocarbon reservoir.
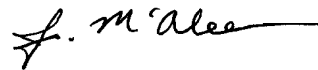
Consequently, Applicants respectfully that the Ito and Calvert references when considered individually or in combination do not teach all of the limitations of independent claims 1 and 36 as amended. Hence, Applicants respectfully request that the Section 103(a) rejections of independent claims 1 and 36 and the respective dependent claims be withdrawn.

CONCLUSION

In view of the foregoing, Applicants believe all claims of the form elected above now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance for such claims at an early date is respectfully requested.

In the event that a fee or refund is due in connection with this Amendment, the Commissioner is hereby authorized to charge any underpayment or credit any overpayment to Deposit Account No 19-0615. If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned via (617) 768-2000.

Respectfully submitted,

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